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(56) Documents Cited

**US 5097363 A**

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UK CL (Edition P ) **G5R RHD RHE**

INT CL<sup>6</sup> **G11B 15/00 15/05 15/087 27/00 27/10 27/19**

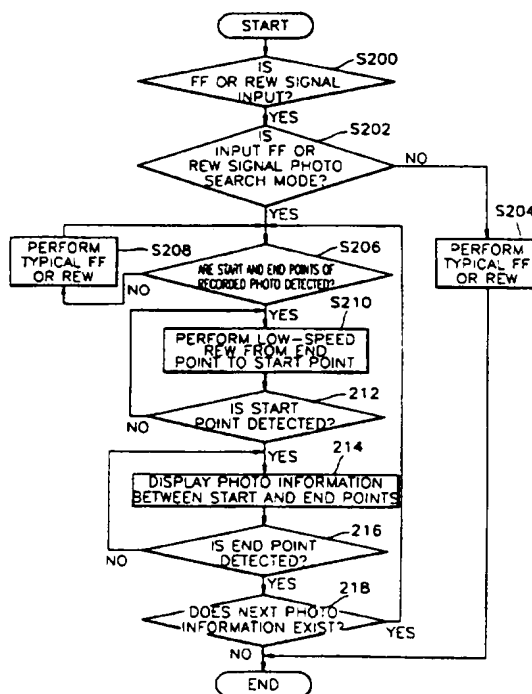
Online: **WPI**

(54) Abstract Title

**Method of scanning and sequentially displaying picture information stored on a digital video cassette**

(57) A method for detecting and reproducing a segment of information, for example a still image, recorded digitally on to a video cassette tape. The method comprises the steps of: (a) detecting the end point (206) of a segment of image data by reading the tape at a first, forward or reverse speed when a search command is input (202); (b) detecting the start point (212) of the same segment of data by scanning the data at a second, forward or reverse speed; (c) reading and displaying the image data stored between said start and end points of the image data segment. By repeatedly performing steps (a) through (c) (218) a plurality of discontinuously recorded images may be sequentially displayed. Therefore, several images may be continuously searched in a short time from a recording medium in which hundreds of frames of picture information are stored.

FIG. 2



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FIG. 1

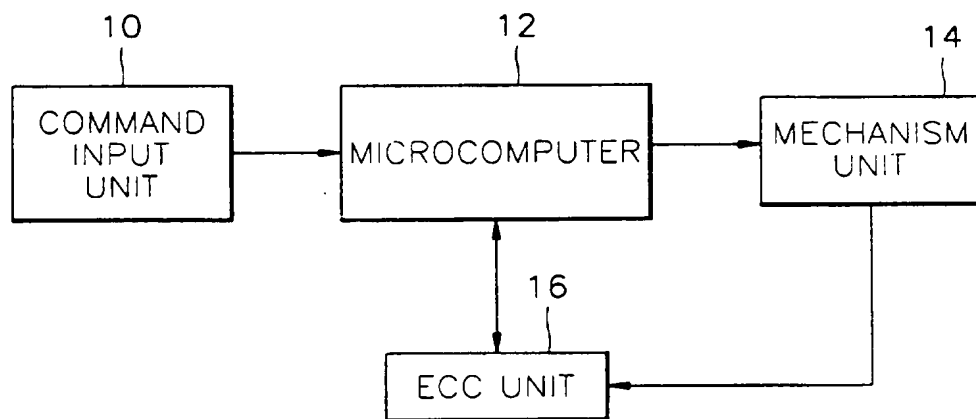
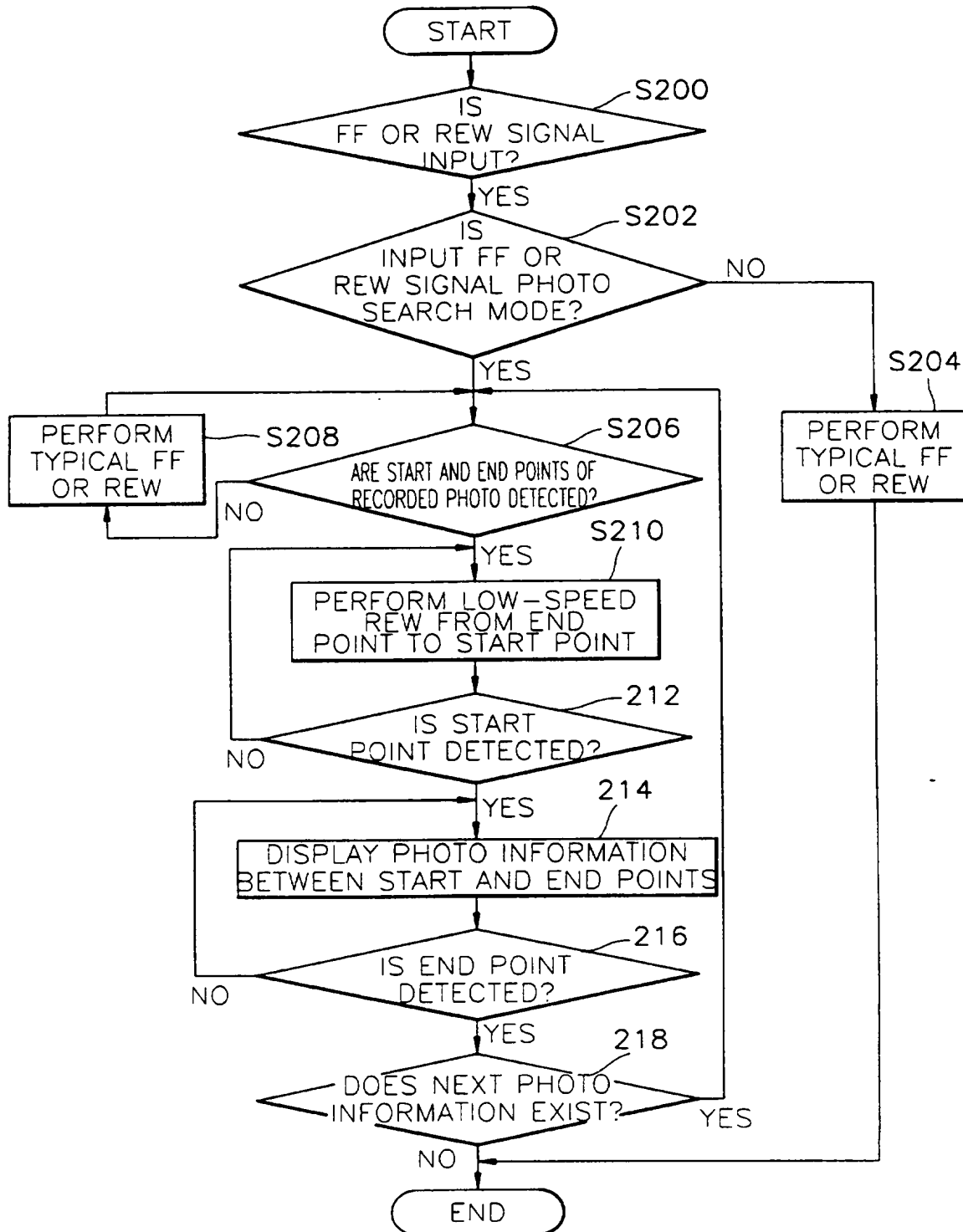


FIG. 2



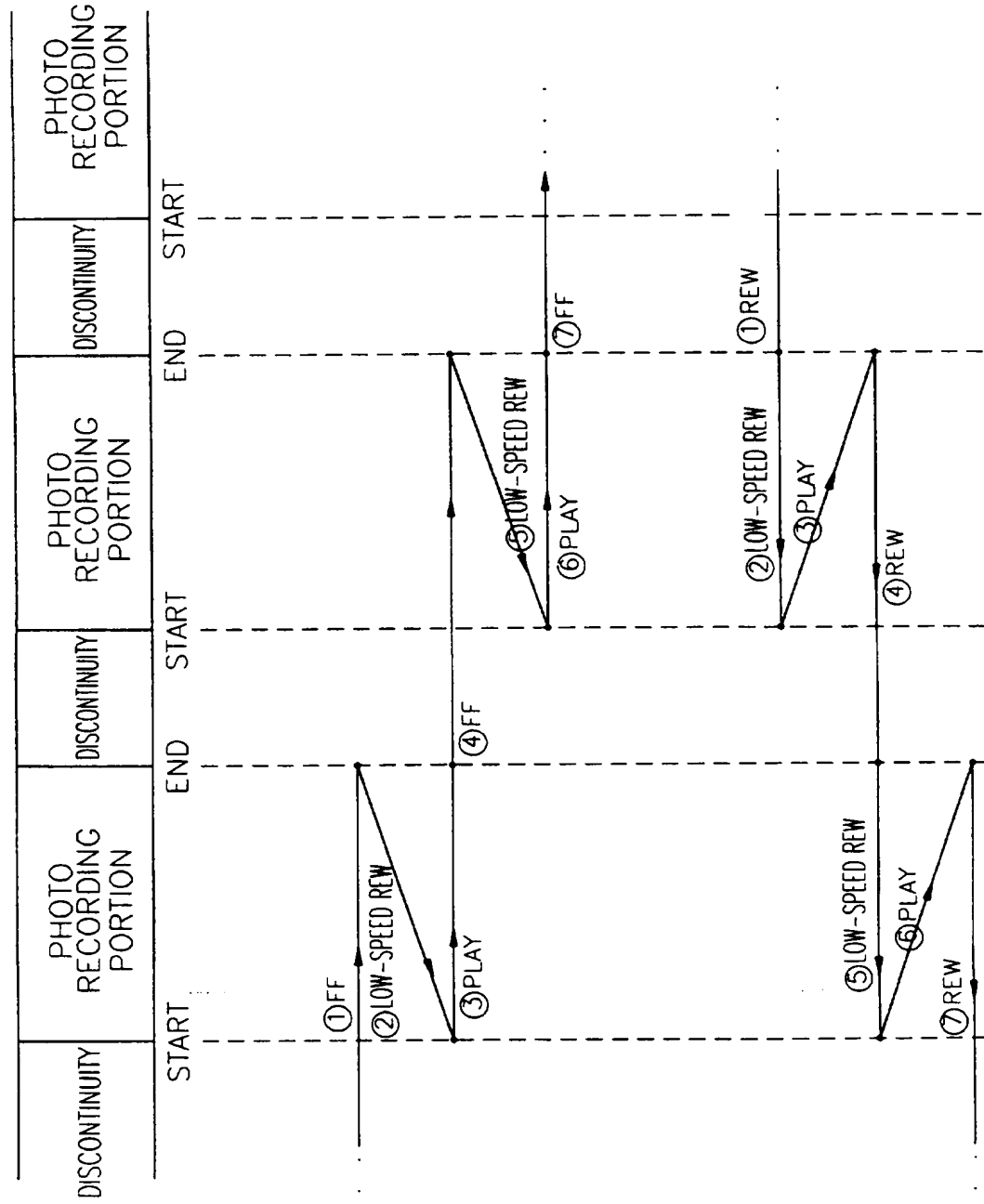


FIG. 3A

FIG. 3B

FIG. 3C

METHOD FOR SEARCHING PHOTO INFORMATION  
IN DIGITAL VIDEO CASSETTE RECORDER (DVCR)

5       The present invention relates to a method for searching photo information in a digital video cassette recorder (DVCR), and more particularly, to a photo information searching method for conveniently displaying a plurality of discontinuously-recorded photo information.

10       A digital camcorder, including a photographing unit in addition to the functions of a DVCR, can record a digital moving picture compression signal on a VHS tape and reproduce the recorded signal. That is, 12 gigabytes of digital signals equivalent to up to 150 minutes of  
15       video can be recorded on a tape. Also, since the digital camcorder uses digital compression and restoration techniques, noise is kept to a minimum, the quality of image does not deteriorate even during recursive reproduction, compact disk quality sound can be realized,  
20       and about 500 sheets of photo information can be stored on a 60-minute tape and edited.

      The photo information is sequentially recorded on a predetermined number of frames when the photographing unit  
25       of the digital camcorder photographs a subject. In the prior art, a user must manually search desired photo information from a recording medium on which a predetermined number of photo information is discontinuously recorded, including manually selecting  
30       between FF or REW and play modes.

      It is an aim of at least preferred embodiments of the present invention to provide a method for searching desired photo information conveniently and within a short

time by continuously displaying discontinuously-recorded photo information.

According to the present invention, there is provided  
5 a method for searching discontinuous photo information  
recorded on a recording medium, said method for use in a  
digital video cassette recorder performing reproduction at  
a variable speed, said method comprising the steps of: (a)  
detecting the end point of a piece of the discontinuously-  
10 recorded photo information by performing reproduction at  
a first variable speed when a search command is input; (b)  
detecting the start point of the photo information  
corresponding to the end point by performing reproduction  
at a second variable speed; and (c) reproducing and  
15 displaying photo information between the detected start  
and end points of the photo information, wherein a  
plurality of pieces of the discontinuously-recorded photo  
information are continuously searched by repeatedly  
performing the steps (a) through (c).

20

Preferably, the start and end points of the photo  
information are detected using photo recording information  
recorded in a subcode area of a recording medium.

25

Preferably, the reproduction at the first variable  
speed is a FF or REW reproduction, and the reproduction at  
the second variable speed is slower than the REW  
reproduction at the first variable speed.

30

For a better understanding of the invention, and to  
show how embodiments of the same may be carried into  
effect, reference will now be made, by way of example, to  
the accompanying diagrammatic drawings, in which:

Figure 1 is a block diagram showing the configuration of a preferred digital image reproducing apparatus for continuously searching discontinuous photo information;

5        Figure 2 is a flowchart outlining a continuous search method for discontinuous photo information recorded in a digital recording medium; and

10        Figures 3A, 3B and 3C are diagrams showing a path for continuously searching discontinuous photo information, wherein Figure 3A shows a digital recording medium where discontinuous photo information is recorded, and Figures 3B and 3C show paths for continuously searching the digital photo information of Figure 3A in FF and REW  
15        modes.

Referring to Figure 1, a digital image reproducing apparatus is shown including a command input unit 10 for applying an execution command, a microcomputer 12 for  
20        receiving a predetermined subcode and outputting a control signal corresponding to the received subcode according to the execution command output from command input unit 10, a mechanism unit 14 for controlling the speeds of a capstan motor, a drum motor, etc., using the control  
25        signal output by the microcomputer 12, and performing reproduction at first and second variable speeds, and an ECC(Error Correction Code) unit 16 for detecting and correcting the error of a reproduced digital signal, and outputting the subcode of reproduction data from an  
30        internally-installed memory. Preferably, the first variable speed denotes the typical FF or REW reproduction, and the second variable speed denotes a REW reproduction which is slower than the first variable speed.

The operation of the apparatus shown in Figure 1 will now be described as follows.

First, when a search execution command (hereinafter,  
5 called a photo search command) of a low-speed REW mode  
(second variable mode) as distinct from a typical FF/REW  
mode (first variable speed) is input through the command  
input unit 10 in order to search discontinuous photo  
information, the microcomputer 12 receives the photo  
10 search command and switches to a photo search mode. In  
the photo search mode, the microcomputer 12 controls the  
mechanism unit 14 to perform an FF/REW operation at the  
first variable speed until the end point of a first photo  
information recorded on a tape is detected. When the end  
15 point of the first photo information is detected, the  
mechanism unit 14 is controlled so that a normal  
reproduction for displaying searched photo information is  
performed after a low-speed (second variable speed) REW  
reproduction is performed up to the start point of the  
20 first photo information. Here, the microcomputer 12  
determines the start and end points of the photo  
information by reading the contents of the subcode  
digitally recorded in a memory of the ECC unit 16 in case  
of a digital control method.

25 Also, the low-speed (second variable speed) REW  
reproduction, which is slower than the first variable  
speed, is performed when the end point of the photo  
information is detected, to search the exact start point  
30 when the photo information is searched from the end point  
to the start point.

Also, for a continuous photo search, a typical FF/REW  
reproduction of the first variable speed is performed  
35 until the end point of a second photo information is



detected after a first piece of photo information is displayed. That is, when the photo search is performed in a FF mode, the FF operation is performed after the completion of display of each photo information. When the  
5 photo search is performed in a REW mode, the REW operation is performed after the display of each photo information.

Also, the low-speed FF/REW operation controls a drum motor and a capstan motor of the mechanism unit 14  
10 according to a phase control that is different from the typical FF/REW operation. The phase control is performed in a method such as an analog FM correction. However, in a digital correction, correction is for correctly reading a subcode rather than the correction itself.

15

Figure 2 is a flowchart outlining a preferred method for continuously searching discontinuous photo information recorded in a digital recording medium.

20 Figures 3A, 3B and 3C are diagrams showing a path for continuously searching discontinuous photo information, wherein Figure 3A shows a digital recording medium where discontinuous photo information is recorded, and Figures 3B and 3C show paths for continuously searching the  
25 digital photo information of Figure 3A in FF and REW modes.

Now, the photo search method shown in Figure 2 will be described with reference to Figures 3A, 3B and 3C.

30

In step 200, a determination of whether a predetermined FF/REW execution command signal is input is made. Then, a determination of whether or not the input FF/REW execution command signal is a photo search mode is  
35 made in step 202.

If the input FF/REW execution command signal is not the photo search mode, the typical FF or REW operation of the first variable speed is performed in step 204. Otherwise, a determination of whether the end point of a  
5 piece of photo information was detected by the typical FF or REW operation is made in step 206. If the end point of a recorded photo information is not detected, the typical FF or REW operation continues until the end point of the recorded photo information is detected in step 208.

10

When it is determined in step 206 that the end point of the recorded photo information is detected, the low-speed (second variable speed) REW operation is performed up to the start point of the piece of photo information  
15 corresponding to the end point, in step 210.

That is, in order to detect the end point of the recorded piece of photo information in the FF mode shown in Figure 3B, the low-speed REW operation is performed  
20 from the end point to the start point when the end point is detected by the typical FF mode operation.

Also, in order to detect the end point of the recorded photo information in the REW mode shown in Figure  
25 3C, the low-speed REW operation is performed from the end point to the start point when the end point is detected by the typical REW mode operation.

When the start point is detected in step 212, the  
30 photo information is displayed in step 214. When the end point is detected in step 216, a determination of whether or not the next photo information exists is made in step 218. If the next photo information exists, another photo search operation is performed in the same way starting  
35 from the step 206.

As described above, in the preferred method for searching photo information in a digital image reproduction apparatus, several frames of photo information are continuously searched and displayed in a short time from a recording medium in which hundreds of frames of photo information are discontinuously recorded.

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any

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novel one, or any novel combination, of the steps of any method or process so disclosed.

**CLAIMS**

1. A method for searching discontinuous photo information recorded on a recording medium, said method for use in a digital video cassette recorder performing reproduction at a variable speed, said method comprising  
5 the steps of:

(a) detecting the end point of a piece of the discontinuously-recorded photo information by performing  
10 reproduction at a first variable speed when a search command is input;

(b) detecting the start point of said photo information corresponding to said end point by performing  
15 reproduction at a second variable speed; and

(c) reproducing and displaying photo information between said detected start and end points of said photo information,  
20

wherein a plurality of pieces of the discontinuously-recorded photo information are continuously searched by repeatedly performing said steps (a) through (c).

25 2. The method as claimed in claim 1, wherein the start and end points of said photo information are detected using photo recording information recorded in a subcode area of a recording medium.

30 3. The method as claimed in claim 1 or claim 2, wherein said reproduction at the first variable speed is a FF or REW reproduction.

4. The method as claimed in claim 1, 2 or 3 wherein said reproduction at the second variable speed is slower than said REW reproduction at the first variable speed.
- 5 5. A method for searching discontinuous photo information substantially as hereinbefore described with reference to the accompanying drawings.



Application No: GB 9724080.8  
Claims searched: 1-5

Examiner: Robert MacDonald  
Date of search: 30 January 1998

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:  
UK Cl (Ed.P): G5R(RHD, RHE)  
Int Cl (Ed.6): G11B(15/00, 15/05, 15/087, 27/00, 27/10, 27/19)  
Other: Online:WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	US 5097363 (TAKEI et al.) See figure 7 and column 6 lines 26 to 43.	1-4

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.